

On the return of the *Porcupine* from her last cruise, so much interest was felt in the bearings of the new discoveries upon important biological, geological, and physical problems, that a representation was made to the Government by the Council of the Royal Society, urging the despatch of an expedition to investigate each of the great oceans, and to take an outline survey of that vast new field of research, the bottom of the sea. The proposition of the Royal Society met with great and general support, and the *Challenger* was fitted out as England never before fitted out a vessel for scientific research.

The University of Edinburgh having given their consent, Prof. Wyville Thomson accepted the post of Director of the Civilian Staff; for this post none could have been better qualified; through his energy was it that this question of what lived in the ocean depths came to be investigated at all; the practical experience he had now gained could not be better utilised, while the subjects to be worked out were all within his reach. Able as a biologist to hold a high position, he combined with this more than an ordinary knowledge of chemistry, mineralogy, and geology, a knowledge far more than enough to enable him to encourage and sympathise with the labours of his staff.

The *Challenger* has now returned to our shores, her mission worthily accomplished, her officers and crew in the best of health and spirits.

All England welcomes Prof. Wyville Thomson back again, and thanks him for his voluntary exile of three and a half years from home and wife and friends for Science sake; and while we congratulate him on having laid a new realm at our feet and on having given us new food for thought, may we express in addition the hope that he will not long delay to give to the world the narrative of a cruise novel in its conception, successful in its results, and destined to live long in story.

THE CRUELTY TO ANIMALS BILL

IT is important that those who understand the national importance of science, as well as those who know how completely the art of medicine depends upon physiology should agree upon a common defence, now that both are so seriously threatened by legislation.

We do not think that scientific investigators can fairly claim to be entirely free in their choice of methods, on account of the importance of their objects, the purity of their motives, or the respectability of their character. Claims to absolute immunity from the interference of the State were maintained on precisely the same grounds by Churchmen in the Middle Ages, and the result proved how dangerous it is for any class of men to seclude themselves from the healthy atmosphere of free criticism and from contact with the popular conscience. A much better plea might be found in the small number of physiologists in this country, and in the important fact that, after many months of agitation and invective, their enemies were not able to bring before the Royal Commission a single authentic instance of cruelty. Still, considering the strong popular feeling on the subject, there are probably few who will deny that some legislation is necessary, if only to save physiologists spending their whole time in writing newspaper articles and going on deputations to Ministers.

What scientific men have a right to demand is that any regulations made should interfere as little with their legitimate objects as is compatible with the purpose of legislation. No one except a few obscure fanatics pretend that it is never lawful to subject animals to pain, or even to death, for self-preservation forbids such a rule; and no one can maintain that it is right to bleed calves and swallow oysters alive, for luxury, to geld horses for convenience, and hunt hares to death for sport, and yet that it is wrong to give one animal a disease that we may learn how to prevent or cure the same disease in thousands, or to perform a well-considered experiment which will certainly increase our knowledge of the laws of our being, and, more or less probably, tend to the relief of human suffering.

It is, therefore, of great importance that none of the objects which justify experiments on animals should be sacrificed in the effort to save the rest. Teachers of physiology in large and well-equipped schools might be content with a registration Bill which would leave them unmolested and forbid all research to outsiders; physicians and surgeons might demand liberty to do anything they choose which has a direct and immediate bearing on the relief of human suffering, and this appeal to self-interest would probably always be successful; independent investigators might see, without complaint, the teaching of physiology reduced to a study of words and opinions, and the advance of medical knowledge brought to a standstill, so long as they were left in peace. But such short-sighted narrowness would bring its own punishment. The results of independent research can only be obtained by those who have themselves been trained in genuine workrooms and can only be properly criticised by a properly instructed audience. Teaching without any attempt at original observation soon becomes lifeless and inexact; and medicine is far less indebted to experiment for the knowledge of the effect of certain drugs or operations, than for the broad basis of demonstrated facts as to the functions of the healthy organism on which all rational attempts to remedy them when disturbed must depend.

The scientific objects, then, which must, if possible, be protected from the mischievous Bill now before Parliament are, first, freedom of original investigation by competent persons; secondly, freedom of teaching by necessary demonstrations; and thirdly, freedom of experiment with the definite aims of the practical physician.

The best method of securing these objects while preventing the stain of cruelty from debasing the fair fame of science, would probably be that indicated by the Report of the Royal Commission. Laboratories would then be licensed under the control of responsible persons. Special certificates would be granted to competent investigators who, from distance or other causes, were not able to make use of these laboratories. The advance of sound physiological knowledge as well as the direct prevention or cure of disease, would be recognised as a legitimate object of experimental inquiry. The general condition of the licence or certificate would be that every experiment on a living animal should be rendered free from pain by the skilled use of chloroform (or other anæsthetic better adapted to the animal), except when this would defeat the object of the inquiry, and happily these exceptions

need be very few. Lastly, inspectors might fairly be appointed to see that not only in the actual experiments, but in the feeding, housing, and general treatment of the laboratory animals there was neither parsimony nor carelessness. The licence would be given on suitable recommendation by the Home Secretary, with power of revoking it for abuse, subject to appeal, as suggested in the Royal Commissioners' Report.

Under such an Act physiologists might fairly be expected to make it a point of honour that its provisions were fully carried out in spirit as well as in letter. The framers of the present Bill, by their disregard of physiology as an independent science, to be taught like any other, do their best to render its progress impossible; while, by their absurdly minute limitations, they would make original research almost as impossible as efficient teaching, and deprive the art of medicine of its only safe foundation.

The efforts of all who care for the advance of human knowledge or the alleviation of human misery should be directed to bring the scope of the Government Bill back to that indicated by the Report of the Royal Commission.

THE SCIENCE OF LANGUAGE

Language and its Study. By Prof. Whitney; edited by Dr. R. Morris. (London: Trübner and Co., 1876.)

Leaves from a Word-hunter's Note-book. By the Rev. A. S. Palmer. (London: Trübner and Co., 1876.)

The Aryan Origin of the Gaelic Race and Language. By the Very Rev. U. J. Bourke (London: Longmans, Green, and Co., 1875.)

THESE three books are very fairly characteristic of the present position of comparative philology. The first is a reprint of the first seven chapters of Prof. Whitney's well-known work on the science of language, and has been admirably edited by Dr. Morris with notes and introduction, with special reference to a scientific study of English. The second is just what it professes to be, extracts from a commonplace book on the etymology of various words, and it illustrates very well the influence exercised by a comparative treatment of language upon what used to be the pastime of literary *dilettanti*. Mr. Palmer's derivations have been traced with full regard to the scientific method, and besides being accompanied by a wealth of quotations, rest for the most part on a secure foundation. "The Aryan Origin of the Gaelic Race," again, is one of those books which a few years back would have teemed with the wildest vagaries; the author, it is plain, has little critical judgment, but a diligent study of works like those of Zeuss or Max Müller has kept him in the right path, and though he startles us now and then with such assertions as that the Aryan is "the primeval language of man," or that "there had been only seventeen letters in Greek at the earliest period," his views are in general just and sound. We may doubt whether his theory of the Pagan origin of the Round Towers will be widely accepted, and complain of his prolixity, but the book is a striking example of the extent to which a knowledge of Comparative Philology has spread, and the wholesome influence its principles have exerted.

When we consider that the science of language is a

science of not more than fifty years' growth, as well as the vast amount of details that had to be collected and classified before its creation became possible, its present advanced condition must be a matter of surprise. No doubt there is still very much to be done; some of the main questions connected with the study of language still remain unsettled, and new questions are starting up that will have to be answered hereafter. It is even possible that fresh knowledge and investigation will modify some of the hypotheses which have been accepted as fundamental truths.

Thus it might have been thought that the first question to be settled would be whether the science is to be included among the physical or the historical sciences, and yet this is even now a matter of dispute. There is much to be said in favour of both views. If we look merely to the fact that it lays down the laws in accordance with which thought endeavours to express itself in speech, it must be regarded as a historical science; if on the other hand, we consider that thought can only be expressed in speech by the help of physiological machinery, we are bound to class it among the physical sciences. If we make phonology not only the beginning, but also the end of linguistic science, linguistic science will differ but little from physiology in aim as well as in method; but if we remember that the various sounds which it is the province of phonology to determine and classify do not become language until they embody a meaning, the science of language will have to be grouped among those other sciences which deal with the history of human development. The same difficulty meets us again in the case of geology, which traces the history of the earth, and if with Prof. Whitney we prefer to regard the science of language as a historical science, while we call geology a physical science, it is because the element of mind enters more largely into the one, and the element of matter into the other. The laws which govern matter remain always the same; those which govern thought and life are modified by a process of internal development.

The science of language, otherwise called glotology or linguistic science, should, strictly speaking, be distinguished from comparative philology. The latter, by comparing words and grammatical forms within separate groups of languages, and thereby ascertaining the nature of these several groups and the laws which govern their growth and formation, provides the materials for the science of language. This takes the results obtained by comparative philology in the various species and genera or families of speech, and with the help of the comparative method determines from them the laws of speech generally. Inasmuch as we have to compare phenomena belonging not only to the same period, but also to different periods in the history of language, that part of linguistic research which is not purely phonological has to assume a historical character, so that to discover the causes of the phenomena is to explain their origin and process of growth. Now the phenomena of language are words and sentences, phonetic utterances, that is, which are or have been significant.

Perhaps the most important result of the science of language has been the demonstration that even language, even those "winged words" over which men once fancied they had the most complete control, are as much subject